Space Weather Forecast

Issued on Thursday, 07 December 2023 at 01:26 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of further isolated Moderate-class flares (R1-R2 Blackouts) throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity is currently Moderate with two Moderate-class flares in the past 24 hours, with a peak M2.3 at 06/2144 UTC which originated from a region in the northeast. There are currently nine sunspot regions on the visible disc. The most active is the aforementioned region in the northeast, which is showing some magnetic complexity. Two other larger regions on the disc reside in the southwest. There is a complex of regions in this area, with magnetic connection between these regions, though spots appear to be spreading laterally. A region on the northeast is also of note, with a north-south magnetic alignment, perhaps increasing instability. The other regions on the disc appear mostly smaller and simpler at present.

A number of coronal mass ejections have been evident in coronagraph imagery during the past 24 hours, though none are currently deemed to have any Earth-directed component.

Solar Wind / Geomagnetic Activity: Solar winds parameters show an ongoing but waning coronal hole high speed stream. Wind speeds were strong but have gradually fallen back to elevated levels. The Interplanetary Magnetic Field has been weak. The north-south component has varied weakly. Geomagnetic activity was Quiet to Unsettled (Kp 1-3).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) persisted at background levels with no solar radiation storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to be Low to Moderate with a chance of further Moderate-class flares, mainly from the region in the northeast, but perhaps also from the regions in the western hemisphere.

Solar Winds / Geomagnetic Activity: A coronal mass ejection from 04 Dec is expected to miss Earth, however, there is a very slight chance of some enhancement and a glancing blow early day 1 (07 Dec). No further Earth directed coronal mass ejections feature in the forecast. Solar winds are currently at elevated levels due to waning coronal hole influences. Solar winds are expected to gradually decline through the coming days, with speeds likely near background levels by day 3 (09 Dec). On day 4 (10 Dec), there is a chance of another coronal hole fast wind arriving, perhaps bringing elevated winds speeds for a time.

Geomagnetic activity is expected to be largely Quiet to Unsettled (Kp 0-3). There is a slight chance early day 1 (07 Dec) that a glancing blow from a coronal mass ejection may produce an Active (Kp 4) or G1/Minor Geomagnetic Storm (Kp 5) interval. On day 4 (10 Dec), the coronal hole high speed stream may bring further Unsettled to Active (Kp 3-4) periods with a slight chance of a G1/Minor Geomagnetic Storm interval (Kp 5).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to remain at background levels, with no solar storms expected.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	1	1	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	50	50	50	50
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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